भारतीय मानक

Indian Standard

IS 1491 : 2023

वास्तु प्रयोजनों के लिए मीट्रिक स्केल — विशिष्टि

(पहला पुनरीक्षण)

Metric Scales for Architectural Purposes — Specification

(First Revision)

ICS 01.100.40

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Educational Instruments and Equipment Sectional Committee, PGD 22

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft is finalized by the Educational Instruments and Equipment Sectional Committee had been approved by the Production and General Engineering Division Council.

Throughout this standard, the term ‘scale’ has been used to denote the ratio of enlargement or reduction to which the drawings are to be made from these scales. The term ‘Scale’ (with *S* in capital) has been used to indicate a strip of material of suitable cross-section with figured divisions along the edge or edges so that dimensions may be read or transferred to a drawing or map.

This standard is intended chiefly to cover the technical provisions relating to metric scales, and it does not include all the necessary provisions of a contract.

This standard was first published in 1959. The first revision has been taken up to keep pace with the latest technological developments and international practices. In this revision, the following changes have been made:

a) More plastic materials have been specified for the manufacturing of plastic scales;
b) Ink adhesion test has been added; and
c) UDC number has been replaced by ICS number.

This standard is one of a series of Indian Standard Specifications on Metric Scales. Other Indian Standard Specifications issued in the series are:

IS 1480 : 1970 Metric scales for general purposes
IS 1481 : 2023 Metric steel scales for engineers
IS 1482 : 1960 Metric scales for use with drafting machines

The composition of the Committee, responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded-off value should be the same as that of the specified value in this standard.

Indian Standard

METRIC SCALES FOR ARCHITECTURAL PURPOSES — SPECIFICATION

(First Revision)

1 SCOPE

This standard specifies the requirements for metric Scales, made of varnished cardboard or of plastic material, used by architects, engineers and surveyors.

2 SCALE DESIGNATIONS

This standard recognizes six different scales, designated as A, B, C, D, E and F, and marked with 12 different scales of reduction as given below:

3 MATERIAL

3.1 Paper Scales

Cardboard paper or paper-backed cardboard shall be used for printing the scales. A single composite white cardboard of the type commonly known as duplex, triplex and mill-board shall be preferred (namely, Bristol board). The finish of the surface shall be preferably glossy. The cardboard from which the blanks are cut shall be smooth, and shall be free from any visible defects like decay, insect attacks, etc. The material shall be able to stand atmospheric moisture under normal conditions.

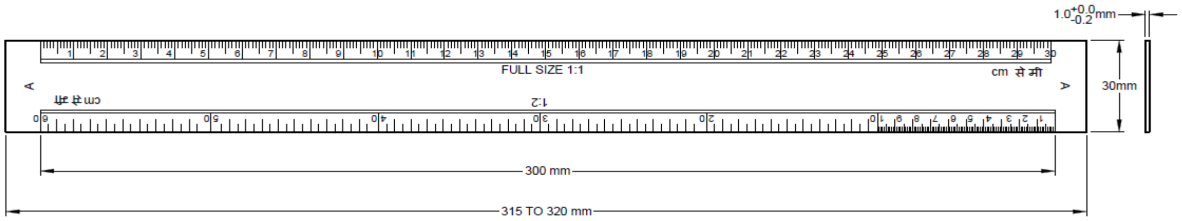
3.2 Plastic Scales

The material for manufacturing of plastic scales can be rigid polystyrene, polymethyl acrylate (acrylic), rigid PVC or PVC copolymer sheets, Plastic — GPPS (general purpose polystyrene) or PC (poly carbonate). The plastic sheet shall be smooth even on all sides and free from blisters, porosity and other defects.

4 DIMENSIONS AND GRADUATIONS

4.1 The leading dimensions of the Scales shall be as shown in Fig. 1.

Sl No. (1)	*Designation* (2)	*Size* (3)	*Scale of Reduction* (4)
i)	A	Full size	(1 : 1)
		50 cm to a metre	(1 : 2)
ii)	B	40 cm to a metre	(1 : 2.5)
		20 cm to a metre	(1 : 5)
iii)	C	10 cm to a metre	(1 : 10)
		5 cm to a metre	(1 : 20)
iv)	D	2 cm to a metre	(1 : 50)
		1 cm to a metre	(1 : 100)
v)	E	5 cm to a metre	(1 : 200)
		2 cm to a metre	(1 : 500)
vi)	F	1 mm to a metre	(1 : 1 000)
		0.5 mm to a metre	(1 : 2 000)



NOTE — In the above figure, Scale A (1 : 1 and 1 : 2) has been illustrated and for Scale A 1 : 2 millimetre graduations have been shown only up to 10 cm.

FIG. 1 OVERALL DIMENSIONS OF METRIC SCALES FOR ARCHITECTURAL PURPOSE

4.2 Graduations

4.2.1 The Scales shall be divided and subdivided as shown in Fig. 1 They shall be graduated on both the edges on one face only.

4.2.2 Graduations shall consist of fine, clear lines of uniform thickness. The thickness of the finest lines for the subdivisions of the Scale shall be 0.10 mm and that for the main division shall be 0.15 mm.

The length of the graduating lines shall be as follows:

Sl No. (1)	*Graduation Mark* (2)	*Length of Graduation Mark Line mm* (3)
i)	cm marks	6
ii)	5 mm marks	4
iii)	mm marks other than 5 mm	2.5
iv)	0.5 mm marks	1.5

4.2.3 The figuring shall be done as shown in Fig. 1. The height of the figures shall be between 2.0 mm and 2.5 mm.

5 ACCURACY

The maximum cumulative error over the entire length shall not exceed ± 0.25 mm, when the Scales are compared against a certified metal Scale.

6 TESTING REQUIRMENTS

6.1 Flexibility Test

6.1.1 The Scales shall be bent round in the form of a segment of a circle till the two ends are brought to a distance of about 20 cm apart. The Scales shall then be stretched and the operation repeated five times. The Scales shall not show any sign of a permanent set after the test.

6.1.2 The Scales shall be held at the two ends and given a twist of 30° and then released. The Scales after this test shall not show any sign of warpage.

6.2 Ink Adhesion Test

A pressure-sensitive tape of at least 75 mm in length and 25 mm in width shall be applied on the marking. Within 90 s ± 30 s of application, remove the tape by seizing the free end and pulling it off rapidly (not jerked) back upon itself at as close to an angle of 180° as possible. Examine the marking and there should be no ink removal.

7 FINISH

The Scales, when made of paper, shall be given a protective coating of over printing varnish.

8 MARKING

8.1 The designations (*see* **2**) shall be marked at each end of the Scales and shall be 4 mm in height.

8.2 The Scale of reduction (*see* **2**) shall be shown below the appropriate edge (*see* Fig. 1).

8.3 The letters ‘cm’ and *‘सेमी’* shall be marked at the end of the Scales.

8.4 Each Scale shall be legibly and indelibly marked with the maker’s name or his trade-mark. The year of manufacture shall be marked on plastic Scales.

8.5 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed there under, and the product(s) may be marked with the Standard Mark.

9 PACKING

Six pieces of Scales shall comprise a set and shall be packed in a suitably sized cardboard case bound in cloth. A table showing an index to 12 different scales from A to F shall be pasted over the casing so as to facilitate easy identification and selection.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Educational Instruments and Equipment Sectional Committee, PGD 22

Organization	*Representatives(s)*
In Personal Capacity (*7/57, Second Floor, Old Rajinder Nagar, New Delhi - 110060*)	DR SUKHVIR SINGH **(*Chairperson*)**
Ambala Scientific Instruments Manufacturers Association, Ambala	SHRI ASHWANI GOEL SHRI PUNEET GUPTA (*Alternate*)
CSIR - Central Scientific Instruments Organisation, Chandigarh	DR S. V. RAMAGOPAL
Directorate General of Quality Assurance, Ministry of Defence, New Delhi	SHRI K. CHANDRASEKARAN
Directorate of Standardisation, Ministry of Defence, DTE of Standardization Government, New Delhi	GP CAPT M. K. PANI
Educational Consultant of India Limited, Noida	SHRI PRADEEP K. S. SHISHODIA SHRI NANDEESH BABU M. G. (*Alternate*)
Indian Association of Physics Teachers, New Delhi	DR MAMTA
Industrial Design Product Design, IIT Delhi, New Delhi	SHRI LALIT KUMAR DAS
Instrument Research and Development Establishment, Dehradun	SHRI SUBHASH CHANDER KUMAR SHRI K. K. KAILASIA (*Alternate*)
Instruments Design Development and Facilities Centre, Ambala	SHRI J. K. S. GANGWAR
Kendriya Vidyalaya Sangathan, New Delhi	SHRI AVINASH DIKSHIT
Kohinoor Slides Rules Fabrik Private Limited, Varanasi	SHRI JEET RAJ MANKHAND
Malaviya National Institute of Technology, Jaipur	DR RAJENDRA KUMAR GOYAL DR RAJEEV AGRAWAL (*Alternate*)
Ministry of Science and Technology, Department of Science & Technology, New Delhi	DR LAXMAN PRASAD SHRI D. PRASAD RAJU (*Alternate*)
National Council of Educational Research and Training, New Delhi	DR GAGAN GUPTA PROF ALKA MEHROTRA (*Alternate*)
National Science Centre, New Delhi	SHRI A. S. MANEKAR
Office of Development Commissioner (MSME), New Delhi	SHRI S. VIJAYA KUMAR SHRI ALURI SURESH (*Alternate*)
Survey of India, Geodetic and Research Branch, Dehradun	SHRI MAM CHAND

Organization	*Representatives(s)*
BIS Directorate General	SHRI RAJEEV RANJAN SINGH, SCIENTIST 'F'/ SENIOR DIRECTOR AND HEAD (PRODUCTION AND GENERAL ENGINEERING)[REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary
SHRI ASHUTOSH RAI
SCIENTIST 'B'/ASSISTANT DIRECTOR
(PRODUCTION AND GENERAL ENGINEERING), BIS

Bureau of Indian Standards

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Amendments Issued Since Publication

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